REMARKS

Claims 1, 2 and 4-11 remain pending in this application.

Claim 9 has been amended to more clearly point out what applicants regard as their invention. Specifically, claim 9 has been amended to point out that a portion of the fine fibers is intruded into at least one face of the filamentary fiber layer with an intrusion index of 0.36 or more to bond, surround or interlace the filamentary fibers. Support for this amendment can be found, for example, at page 12, lines 3-28 of the present specification and claim 1. Accordingly, no new matter has been introduced by this amendment.

Claims 1, 2 and 4-11 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Perkins et al. (U.S. Patent No. 5,178,932) in view of McAlister (U.S. Patent No. 3,494,819) and Bessey et al., "Solid Phase Processing of Polymers" and Fourne, "Synthetic Fibers." Perkins et al. teaches forming a multilayer nonwoven fabric by melt-extruding the various layers (col. 3, line 51 - col. 4, line 17). The term "melt-extruding" as used by Perkins et al. includes well known processes such as meltblowing and spinbonding (col. 5, lines 1-8). According to the Abstract, the nonwoven composite structure may comprise three layers, where the first and third layers consist of randomly deposited filaments in excess of 7 microns, whereas the intermediate layer is made of a mixture of an additive that imparts alcohol repellency and microfibers having a average diameter of 0.1 to 10 microns. The boundary layer between at least two adjacent layers is said to be indistinct because the fibers at or near the surfaces of adjacent layers are significantly intermingled (col. 6, lines 45-48).

The Office recognizes that Perkins et al. fails to teach or suggest most of the recited parameters such as bulk density, intrusion index, crystallinity, solution viscosity

or pressure employed, but concludes these parameters would have been obvious since they could have been obtained by routine experimentation. With respect to polyester fibers (not applicable to claims 7 and 11 where fibers are recited to be composed of polyamide resins), McAlister is said to teach that fibers having a higher crystallinity have higher tenacity, but poorer bonding properties, Bessey et al. is said to teach that the spinning speed is directly related to the degree of crystallinity, and Fourne is said to teach a suitable solution viscosity for spinning polyester fibers.

The present invention is directed to a nonwoven fabric, and method of producing it, that is excellent in tensile tenacity and has good filtering and barrier properties (page 5, line 29 to page 6 of the present specification). As a result of their investigations, applicants have found that there is a significant positive correlation between the intimate mixing (i.e., intrusion) of the melt-blown fine fibers in the interior of the filamentary fiber web layer and properties of the laminated nonwoven fabric such as tensile strength, tear strength, 5% modulus, fluff formation resistance and layer-to-layer peel tenacity (page 6, line 29 to page 7, line 11 of the present specification). The "intrusion index," a numerical evaluation of the degree of intrusion of fine fibers into the filamentary fiber layer and the bonding and surrounding of filamentary fibers with fine fibers, increases with the degree of fine fibers into the filamentary fiber layers, and a degree of surrounding filamentary fibers with fine fibers (page 10, line 30 to page 11, line 10 of the present specification).

When the fine fiber has a crystallinity of 17.8% to 34.3%, the fine fiber has fluidity and can easily intrude into the filamentary fiber layer(s) and thus a high rate of intrusion (0.36 or more) is achieved. As a result of the anchoring effects of the intruded fine

fibers, the spun-bonded laminated nonwoven fabric that has excellent tensile tenacity can be obtained (see page 14, line 26 to page 15, line 6 of the present specification).

The object of the Perkins et al. fabric is to provide an improved alcohol repellant and antistatic three layer nonwoven composite structure (see col. 1, lines 37-39 of Perkins et al.). There is no description and no suggestion in Perkins et al. that the recited parameters in any way could be altered or adjusted to achieve a laminated nonwoven fabric with improved tensile tenacity, or that this improvement can be achieved by controlling the crystallinity of the fine fibers which, in turn, has a positive influence on the intrusion index when controlled within the ranges recited in these claims. There is no disclosure in any of the prior art relied on that the crystallinity influences the degree of intrusion of the meltblown fibers into the outer layer(s). In addition, the sole Example in Perkins et al. uses polypropylene (a most preferred thermoplastic polymer according to Perkins et al. at col. 6, lines 20-30), which has a crystallinity of almost 50%, well above the values recited in the claims, that would lead a person skilled in the art away from the range recited in the claims.

The Office has relied on the teachings of McAlister for the general proposition that polyester fibers having a higher crystallinity have higher tenacity but lower bonding properties, while polyester fibers having lower crystallinity have lower tenacity but better bonding properties. In addition to the fact that such a teaching would not be relevant to claims 7 and 11 that are drawn to polyamide fibers, McAlister does not provide any guidance regarding the determination of an appropriate crystallinity in the context of a multilayered fabric where the tensile tenacity is at least partly derived from the intrusion factor, or the relationship of the fine fibers of the intermediate layer with the filamentary

fiber layers. As Perkins et al. uses polypropylene fibers having a crystallinity of about 50%, a person skilled in the art would be directed to use fibers having that crystallinity, and not the range recited in claim 1, for example.

Neither Bessey et al. nor Fourne contain any teachings relevant to the fabric or method taught in Perkins et al. as neither of these documents recognize the interrelationship between crystallinity of the fine fibers and the intrusion index as a way to improve the tensile tenacity of the laminated fabric. Bessey et al. simply indicates one parameter of the fiber formation process that can be controlled to adjust the degree of crystallinity, but there is no indication that crystallinity of the fine fibers should be controlled in the context of the claimed invention or that such control is important to controlling the degree of intrusion.

For all the reasons discussed above, this rejection should be withdrawn.

Prompt and favorable reconsideration is requested.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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